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AUTHOR	Jhangiani, Arjan K.
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ABSTRACT

This paper is an analysis of some of the literature concerning group mediated risk taking. Jhangiani explores Brown's V-theory, which states that members of a society try to realize its cultural ideals in their behavior; Nordhoy's theory of cultural values, which states that "In the group, the impact of values which are commonly accepted in the culture to which the subjects belong will be reinforced;" and Marquis' and Reitz' theory of risk, that 2 independent forces (expected value maximization and uncertainty reduction) affect group outcomes in risk situations. He critizes Brown on the fact that the theory is not stated in a fashion designed to facilitate the derivation and testing of strong hypotheses, Nordhoy on the grounds that he never defines "cultural values", and Marquis and Reitz on the charge that they have not specified the behavioral analogues of the 2 independent variables. Yet, in the final analysis, he believes the Marquis and Reitz attempt has an adequate behavioral base and just might turn out to be the sleeper on the subject. (Author/TA)

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Group Mediated Risk Taking and Cautious Behavior: A Methodological and Theoretical Analysis[1]

Arjan K. Jhangiani

University of Hawaii

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Within the last ten years, considerable evidence has accumulated which tends to show that group discussions cause group members to prefer a greater degree of risk taking or caution than they had originally advocated when responding as individuals. This phenomenon was first found by Stoner (1961) among business school students and has since been called "risky shift", because, the predominant direction of shift was toward enhanced risk taking after group discussion of the issues. Stoner used a set of 12 life-like situation items developed by Wallach and Kogan (1959) to test the hypothesis that groups are more cautious than individuals. He found that on the instrument as a whole, group decisions were significantly more risky than the mean of the individual group members prior decisions. The phenomenon's inherent interest and credibility have been further enhanced by the findings that the shift was generalizable to other college students of both sexes (Wallach, Kogan and Bem, 1962), different nationalities, e.g., Germany (Lamm and Kogan, 1970), France (Zaleska and Kogan, 1969) and ethnic backgrounds (Lewit and Saville, 1971). The interest in the phenomenon has also been fanned by the finding that the shifts are not restricted to one direction, i.e., cautious shifts have also been observed (Nordhoy, 1962 and Stoner, 1968). An exception to this trend has been a study by Clark and

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Willems (1970), who found that by excluding the instruction to "check the lowest probability", the risky shift diaappeared. They contend that by asking the subjects to check the lowest probability, the dice is being loaded in favor of lower probabilities or greater risk. Though the instruction "lowest probability" could easily be substituted by a variety of protocols, e.g., "reasonable probability" etc., the issue appears to be much more complex than Clark and Willems suggest. How for example, does one explain the conservative shifts found on problems 5 and 12 employing the same instructions? For that reason, how does one explain both risky and conservative shifts in paradigms where the instruction "lowest probability" is never used, e.g., Zajonc et al (1968, 1969, 1970), Hubbard (1963), Marquis and Reitz (1969), etc. We feel that the Clark and Willems thesis is not substantiated.

Several theories have been offered to explain why this shift takes place. We will review the three most prominent explanations. The first two explanations have been extensively researched and the last one offers considerable heuristic possibilities.

Brown's V-theory

Brown (1965) presents a value theory which attempts to explain both the risky and the conservative shifts found on the W&K problems. Brown feels that the W&K situations elicit two values (risk or caution) which mediate behavioral preferences. Some of these situations elicit the "risky" value. On these items, Ss consider it desirable to be more risky than other people. Other items elicit the caution oriented value and on these items, Ss consider it desirable to be more cautious than other people. The role of group discussions consists in giving subjects the opportunity to find out if they are as risky or cautious as they had originally expected

to be. Upon realization that they are not as close to their personal ideal of riskiness or caution, as they had originally believed, Ss moved in the desirable direction, i.e., toward enhanced risk taking on items on which they had initially felt that it was desirable to be more risky than others and toward greater caution on items on which they had initially felt it was desirable to be more cautious than others. The theory may succinctly be stated as follows:

a. The paragraph information engages several action dispositions which coalesce into either of two resulting vectors, risky or cautious tendencies.[2] If the risky tendency is engaged, then the individual perceives himself to be equally or more risky than his peers. If the cautious tendency is engaged, then the individual making the risk evaluation perceives himself as equally or more cautious than his peers.

b. Upon realization in the group discussion that others and not him are closer to the ideal of risk behavior, the individual modifies his values upward or downward depending upon whether the item elicits the risky or the cautious tendency. The discussions help him in "specifying" the cultural value in the situation.

c. The role of the resultant vectors, i.e., cautious or risky tendencies, consists in directing the generation and flow of "relevant" information: "The value engaged will influence the flow of information so that more relevant information will be elicited supporting the value than opposing it." (p. 705)

The above mechanisms may be summarized by saying that members of a society try to realize its cultural ideals in their behavior.[3] The pre-group individual situation is an iformation vacuum as far as knowledge

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[2] If the Ss feel that it is desirable to be riskier than others, then Brown would say that the risky tendency has been engaged. Similarly for caution.

[3] One wonders if the same statement could be made with regard to social drop-outs and hippies.

of the cultural norm is concerned. In the group discussion situation, the dominant cultural value (risk or caution) directs the flow of elicited information in its favor because there is essential agreement that it is the appropriate value in the situation. The discussion centers on the correct magnitude and not the appropriateness of value in question. The realization that one does not epitomize the cultural ideal as reflected by other members impels one to move in the appropriate direction. The person who has shown a pre-discussion deviation in the right (culturally valued) direction does not feel the same pressure to change because he more than amply epitomizes the ideal.

Criticism

The theory is not stated in a fashion designed to facilitate the derivation and testing of strong hypotheses. For example, Brown does not specify the conditions under which either risk or caution is warranted, which is a serious shortcoming. Apparently, the individual intuitively senses when risk or caution is warranted. Also, Brown provides no guidelines as to what is "relevant" information so that verification of the flow of control of "relevant" information becomes well nigh impossible. The issue regarding why the extreme deviants in the "right" direction do not feel strong pressure to conform is also not discussed. No mention is also made of the conflict between equally strong risk and caution and its consequences for group behavior. How do groups resolve issues which engender conflict between high risk and high caution. The ramifications of this entire domain of issues has not been explored by Brown's theory. This author feels that some of these issues have important implications for creating reversals in the shifts exhibited by the W&K items and need attention by serious investigators in this area.

One other charge that merits ventilating against Brown is that he makes no attempt to indicate how his theory differs from Nordhoy's theory of Cultural Values from which it appears to have originated. There is no effort to detail the shortcomings of Nordhoy's formulations and why a new explanation is even necessary. This has resulted in considerable confusion among researchers regarding the difference between the two formulations and who to give credit for the Value theory.[4]

Stoner (1968) in an attempt to corroborate the Nordhoy-Brown value formulation, tested Brown's first postulate. Accordingly, items which engage caution as a value should elicit cautious initial perceptions by subjects about themselves--they should perceive themselves to be more cautious than their peers in the individual situation. Similarly on items which engage cultural values oriented toward risk, subjects should perceive themselves as riskier than their peers. Stoner's subjects were asked to make probability recommendations to the central person in each problem as well as to guess the responses of "200 other people like you". His results were consonant with the risky portion of the Value theory, i.e., individuals considered themselves as significantly more risky than their peers on risk oriented items. However, on the caution oriented items, they did not consider themselves as more cautious than their peers; only two out of five caution oriented items exhibited significant differences between self perception and estimates of "200 others" positions.

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[4] Even "well informed" investigators like Stoner (1968) have difficulty distinguishing between the two. This author for one feels that the differences between the two are minor with Nordhoy deserving the credit for the theoretical structure. In all fairness, part of the blame lies on Nordhoy for not publishing his findings.

Nordhoy's theory of Cultural Values

Nordhoy (1962) attacked the problem of risky shift from the point of view of what he calls, "values common to a culture". He analyzed the W&K problems in terms of the multiplicity of accepted social values engaged by each problem and the conflict engendered by it. For example, the first W&K problem involves a young electrical engineer who is beset by a conflict between his present employment position which is secure, but offers little potential for financial advancement and a prospective position which offers very high monetary potential but has poor job security prospects. Nordhoy sees this situation as a conflict between an individual's value which prizes job security and a cultural value which suggests that young people should take chances to get ahead. According to Nordhoy, group discussions through surfacing of arguments favorable to the cultural value reinforce its impact. Nordhoy suggests that, "In the group, the impact of values which are commonly accepted in the culture to which the subjects belong will be reinforced. The members will express opinions, and also accept arguments more readily which are concordant with these accepted values." (p. 19)

Nordhoy's strategy for evaluating his hypothesis consisted of attempting to reverse the direction of shift of W&K items (from risky to conservative and vice-versa) by introducing new cultural values which were felt to be stronger than existing values in the item. He reasoned that successful reversals would indicate that it is indeed the cultural values which affect the direction of the shift. As a test of this strategy, Nordhoy modified three of the W&K risky items (nos. 2, 3 and 9) in the conservative direction and a conservative item (no. 12) in the risky direction. Two problems (nos. 1 and 7) were used as control problems.

Nordhoy succeeded in three out of four cases, i.e., on items 2, 3 and 12 he was able to reverse the direction of the shift. The only item that did not reverse the number 9 which pertains to the dilemma faced by an American prisoner of war during W.W.II, whether to escape or not. Remarkably, Nordhoy succeeded in reversing item number 12 which pertains to the dilemma faced by a male central person who is contemplating marriage.

Critique of Nordhoy

Historically and theoretically, the creation of conservative items was a significant achievement, perhaps a landmark. However, their creation does not constitute corroboration of the Cultural Values hypothesis. Take for example item no. 12. If by introducing statements of the type, "F and M are about 30 years old", "They are much in love" or "They seek advise from a friend who is a psychiatrist", its direction of the shift is reversed, it still cannot be concluded that it was the "cultural-values" which caused the change. One might ask, is each of these three statements a separate cultural value or do they combine to form one cultural value which caused the shift? Nordhoy provides no answers to this question. Another intriguing possibility (to be explored later) is that the above statements constitute surplus information, provision of which, brought about the reversal. At any rate, it appears that there were just too many uncontrolled factors, any or all of which could have contributed to the change.

An issue that is felt to be important but one that has been totally ignored by theorists in this area pertains to explication of the term "cultural values". The term has been bandied about without any attempt at anchoring it or tying it down to specifics. What for example is a cultural value? Are these values stable over time periods or do they change

frequently?[5] What types of populations share them and what regions are they prevalent in? None of the theorists has shown any interest in these issues. Their importance will become evident when we discuss Stoner's findings, especially the stability of Nordhoy's conservative items.

An analysis of Nordhoy's data done by this author resulted in findings which appear to be both significant and revealing. Nordhoy, in his first experiment gave his subjects six dilemma type problems. The first two problems in this series were original W&K items (nos. 1 and 3) and the rest were either totally new or were variation of W&K items. After completing each problem, subjects (approximately 50) were asked to rate their basis for specifying the lowest acceptable probability on an information adequacy-inadequacy scale. The scale had five intervals and ran from very good to very poor bases. The guidelines for making the response on this scale were.

1. insufficient information,
2. lack of familiarity with the topic, and
3. subject's lack of qualification in the area.

Since, the W&K type problems call for judgment in situations comprehensible and known to most of us and do not call for any real expertise, it is this author's contention that the most important criterion entailed in judging the adequacy was the insufficiency of information in the paragraphs. Acting on this hunch, a correlation between the means of initial risk values and the basis-for-decision values for Nordhoy's six items was computed. This

[5] The Greening of America, by Charles Reich, a Yale psychiatrist suggests that American values are undergoing a violent change and are being replaced by values of the flower children. The Lonely Crowd by Reisman is similarly suggestive of the change in personal values. Needless to say, there are many theorists who disagree with both Reich and Riesman.

correlation turned out to be an astonishing +.97.[6] The correlation implies that lower the initial risk values, poorer the basis for decision, i.e., less sufficient the information contained in the paragraphs for making the decision, lower the initial risk value. This leads one to ask if risk commitment and caution are functions of the amount of information possessed by the subject about the situation.[7] Since we are most familiar with our own personal situations and less so with others', does the psychological distance from the central person and shortage of information about him lead one to suggest risks to him that we would not accept for ourselves or people well known to us? If so, then this theory would be the exact opposite of Brown's theory of risk as a value. Brown's risk theory suggests that people take risks because risk taking is culturally desired. The information adequacy theory on the other hand seems to suggest that most people do not take risks in significant social situations. Rather, they leave it to others. This suggests a world of few heroes, but many on-lookers who get vicarious pleasure out of the heroes' exploits (sex-ploits)! If popular magazines like Time, Newsweek, etc. can be accepted as good barometers of the American ethic, then it would appear that the information-adequacy formulation and not Brown's theory is the more correct explanation.

Scrutiny of Nordhoy's data points also revealed that both of the unmodified W&K items rated between poor to less-than-fair on the adequacy

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[6] In all fairness, our correlation was computed between mean values and not individual values. Normally, this leads to an inflated estimate of the true relationship due to the reduction in the error variance. Even so, the size of the correlation (+.97) is too large to ignore.

[7] This statement is subject to the constraints imposed by ceiling effects.

scale while the remaining items (modified W&K and new items) rated between almost-fair to fair. The contention then reduces to two issues: Was the reversal in the shifts caused by the introduction of more potent cultural values or because of a better illumination of the dilemma? It would appear that it is the latter, though, there is a definite need for better evidence to resolve the issues. Unfortunately, Nordhoy did not run the relevant subjects in groups, making it impossible to predict the magnitude and direction of any shift. The outcomes would have been particularly interesting for the specially designed items. Nordhoy did, however, run some (extra) subjects in groups without first running them as individuals.[8] A comparison between the values for these items for the two treatments ("individual only" and "group only") revealed that three out of four of the specially designed items (these had relatively higher scores on the information adequacy scale) manifested greater, though not significantly greater caution in the "group only" condition. On the other hand, both of the unchanged W&K items (these items had relatively lower scores on the information adequacy scale) showed greater risk, one of them being significantly different at the .05 level! What this suggests is that adding relevant information and not the introduction of stronger cultural values is the crucial factor. This opens up an interesting possibility: how does "relevant information" differ from "cultural values"?

Experimental Evidence for Nordhoy's Formulations

Following Nordhoy, discussion of the issues within the group results in the resolution of value conflicts implicit in the W&K situations. The

[8] This is the only time this design has been implemented.

value which epitomizes the culture,[9] finally emerges as the group value. In an attempt to test this hypothesis, Stoner (1968) created an independent measure of values. Subjects were asked to rank 18 value statements in the order in which they were important to them. The statements were general in nature and were implied by the two decisional alternatives[10] in each problem, e.g., "winning games of competitive nature", etc. It was hypothesized that items which were latently risky[11] should exhibit a higher ranking for the risky value implied by the problem than for the conservative value implied by the same problem. Similarly, caution oriented items should exhibit a higher ranking for the cautious value implied by them than for the risky values implied by them. Stoner found that for all latently risky items, the median rank of the values related to the risky alternative was consistently lower[12] than the values related to the cautious alternative, i.e., the cultural values related to the risky alternative were more highly preferred than the cultural values related to the conservative alternative. Similarly, the values related to the cautious alternative for items latently cautious were ranked lower than values related to the risky alternative, i.e., conservative values were more highly preferred than risky values for latently cautious items. This finding would appear to signify a resolution of the theoretical conflict that has raged in this area. But there is a

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[9] Nordhoy does not specify apriori what this value is. He suggests (without evidence) that the discussion serves to reinforce this value which mediates the risky/conservative outcome.

[10] Each W&K problem has a "risky" and a "cautious" alternative.

[11] Items constructed with the expectation that risky shift will ensue are defined as latently risky. The same logic applies to items considered latently cautious.

[12] Lower the arithmetic value, higher the rank, e.g., 1 has the lowest arithmetic value and the highest rank.

fly in the ointment. All items which were expected to exhibit a risky shift did in fact do so. However, only two out of five of the latently cautious items exhibited a conservative shift. In fact, one of them turned out to be risky!

Stoner's findings constitute a serious blow to Nordhoy's contentions that group discussions affirm the primordial cultural value extant in situations involving decisional dilemma. Apparently, loading the items with cautious cultural value is not the key to creating conservative shift. Unfortunately for Nordhoy, neither of his conservative items were replicated in the Stoner study. This makes one wonder if Stoner's two conservative items are any more stable than Nordhoy's. This is what was implied when it was suggested earlier that the term cultural value needs to be operationally anchored to specifics.

Economic (Grambling) Theories of Risk

Marquis and Reitz (1969), in a theoretical report suggested two independent forces that affect group outcomes in risk situations, i.e., expected value maximization (EVM) and uncertainty reduction (Un). The forces which tend to maximize expected value are conceived as polarizing. Thus, if the prediscussion expected value[13] in the situation is away from zero (positive or negative) than the group process acts to further propel the value toward its appropriate extreme end. Thus, if the pre-discussion expected value is negative (loss function) then EVM causes it to become more negative, i.e., induces a conservative shift. If it is positive (gain function) then expected value maximization causes it to become more positive, or, induces a risky shift. The uncertainty reduction force on the other hand is hypothesized

[13]Expected value of a bet = Prize X Probability - Stake

to act only in one direction, i.e., toward enhanced risk-taking. Marquis and Reitz derive the following hypothesis from their theory (see Figure 1):

Derivation 1: Under conditions of pure risk (zero uncertainty) only the expected value parameter will be maximized. (Since, the Un parameter is equal to zero, therefore, there is no potential for Un reduction.) If the initial expected value is positive, then, a shift toward risk is predicted. If the initial expected value is negative, then a conservative shift is predicted.

Derivation 2: Under conditions of Uncertainty (Un > 0), the forces for uncertainty reduction and expected value maximization will act either in concert or in opposition, depending upon the situation.

2.1: Under conditions of Uncertainty and zero expected value, EVM will be zero. The group process will act to reduce Un and therefore a risky outcome is predicted.

2.2: Under conditions of Uncertainty and positive expected value, both EVM and Un will act in concert to produce a strong risky shift.

2.3: Under conditions of Uncertainty and negative expected value, EVM and Un will oppose each other and the outcome will reflect which of the two forces is dominant in the situation.

A specially constructed table (Table I) summarizes the findings reported by Marquis and Reitz (1969). It is evident that Hypothesis 1 is corroborated in its entirety (cells 1, 2 and 3). Taking an average value of cells 5 and 8 (EVM = +, Un > 0), the outcome appears to corroborate Hypothesis 2.2. The outcome in cell 9 appears to be in line with the prediction under Hypothesis 2.3, because EVM should overwhelm a low Un force. However, a standoff between EVM and Un is predicted for the cell 6 (EVM = +, Un >> 0). This is belied by the data indicating that Un reduction may have a questionable impact in the negative expected value situation.[14] Comparison of cells 2

[14] Marquis and Reitz in another experiment lowered the value of negative expected value to 10 per cent of the stake instead of the original 25 per cent. In this case they found that the Un force was able to overwhelm negative EVM and a risky shift was reported in consonant with the derivation in 2.3.

and 5, however, suggests the Un reduction does affect outcomes in positive E.V. decision situations. We recommend a test between cells 2 and 5 to evaluate the role of high Uncertainty reduction. Surprisingly, cell 4 exhibits a non-significant risky shift -- an apparent discorroboration of Hubbard (1963). The fact that these are aggregate values across the three parameters may have something to do with it.

Though the Marquis and Reitz model is reasonably specific about the parameters and their actional modalities, it does not specify the behavioral analogues of Expected value maximization and Uncertainty reduction. What for example is implied behaviorally when it is said that Expected Value has been maximized or that Uncertainty has been reduced. The term expected value maximization has its origin in economics. The economist, fully content with the fictional construct expected value maximization feels no needs to specify how the construct gets maximized. His domain of concern consists in specifying the situations in which expected value is maximized and not the behavioral process which bring it about. It is however mandatory for psychologists who are interested in manipulating these fictional constructs to anchor them to specific behaviors so that their existential import can be verified. This Marquis and Reitz have not done.

Final Comments

This review has by no means been comprehensive. Several other explanations offered by researchers in this area, e.g., Familiarization (Bateson, 1966), Diffusion of responsibility (Kogan and Wallach, 1967), Leadership (Marquis, 1962), Extremity of Variance (Burns, 1967), etc. have not been covered. The first three hypotheses (at least in their present form) have been extensively researched and found to be wanting. The extremity variance

hypothesis is essentially an empirically derived equation. Burns who is its originator is apparently its only protagonist. On the other side of the equation, Hoyt and Stoner (1968) report evidence which appears to be quite damaging to Burn's thesis.

Of the theories reviewed here, it is felt that the value theories have gained currency primarily because of their face validity and due to their in-explicit formulation. It is felt that as the requirements for theory construction in this area become more rigorous, these theories will be supplanted by more comprehensive and explicit explanations. The Marquis and Reitz attempt is felt to be in that direction and with an adequate behavioral base, it may just turn out to be the sleeper in this area.

BIBLIOGRAPHY

Bateson, N. Familarization, group discussion, and risk taking. Journal of Experimental Social Psychology, 1966, 2, 119-129.

Brown, R. Social Psychology, New York: The Free Press, 1965.

Burns, J.A.F. An extremity variance model of risk taking. Unpublished Doctoral Dissertation. School of Industrial Management, Massachusetts Institute of Technology, 1967.

Clark, Russell D., & Willems, Edwin P. Where is the risk shift? Journal of Personality and Social Psychology, 1970, 13, 215-221.

Hoyt, G., & Stoner, J. Leadership and group decisions involving risks. Journal of Experimental Social Psychology, 1968, 4, 275-284.

Hubbard, John H. Effects of uncertainty on individual and group risk taking. Unpublished master's thesis. School of Industrial Management, Massachusetts Institute of Technology, 1963.

Kogan, N., & Wallach, M. Risk taking as a function of the situation, the person, and the group. New Directions in Psychology, III. New York: Holt, Rinehart & Winstong, 1967b.

Lamm, H., & Kogan, N. Risk taking in the context of intergroup negotiation. Journal of Experimental Social Psychology, 1970, 6, 351-363.

Lewit, D. W. & Saville, M. R. Can groups be conservative?: the case of realism. Paper presented at the Seventeenth Annual meeting of the West Coast Conference for Small Group Research, Honolulu, Hawaii, April 1971.

Marquis, D. G., & Reitz, H. J. Effect of uncertainty on risk taking in individual and group decisions. Behavioral Science, 1970, 14 (4), 281-288.

Nordhoy, F. Group interaction in decision making under risk. Unpublished master's thesis. Sloan School of Management, Massachusetts Institute of Technology, 1962.

Pruitt, D. G., & Teger, A. I. The risky shift in group betting. Journal of Experimental Social Psychology, 1969, 5, 115-126.

Stoner, J.A.F. A comparison of individual and group decisions including risk. Unpublished master's thesis. School of Industrial Management, Massachusetts Institute of Technology, 1961.

Stoner, J.A.F. Risky and cautious shifts in group decisions: The influence of widely held values. Journal of Experimental Social Psychology, 1968, 4, 442-459.

Wallach, M. A., Kogan, N., & Bem, D. J. Group influence on individual risk taking. Journal of Abnormal and Social Psychology, 1962, 65, 75-86.

Wallach, M. A., & Kogan, N. Sex differences and judgment processes. Journal of Personality, 1959, 27, 555-564.

Zajonc, R. B., Wolosin, R. J., Wolosin, M. A., & Sherman, S. J. Group risk-taking in two-choice situation: Replication Extension, and a model. Journal of Experimental Social Psychology, 1969, 5, 127-140.

Zajonc, R. B., Wolosin, R. J., Wolosin M. A., & Loh, W. D. Social facilitation and imitation in group risk-taking. Journal of Experimental Social Psychology, 1970, 6, 26-46.

Zaleska, M. & Kogan, N. Level of risk selected by individuals and groups when deciding for self and for others. Princeton, New Jersey: Educational Testing Service, 1969, no. RB-69-9.